29 can be found at page 14, lines 15-19 of the specification.

Applicants have also amended the specification to add new Fig.'s 1-3 as part of the Drawings. In particular, Fig.'s 1-3 are a graphical representation of the relationship $Y \leq 0.29dX$ where the melt flow rate, X (g/10 min), is the X-axis and the thickness, Y (μm), is the Y-axis. The Fig.'s 1-3 are only defined where melt flow rate X is from 5 g/10min to 40 g/10min and where the thickness Y is from 70 μm to 300 μm.

More particularly, Fig. 1 represents where the density is 100 g/L while Fig. 2 represents where the density is 150 g/L and Fig. 3 represents where the density is 207 g/L. Support for all the Fig.'s 1-3 can be found in claim 1 as well as pages 6-8 of the specification.

No new matter within the meaning of §132 has been added by any of the amendments.

Applicants note that the Office Action Summary page and all subsequent pages incorrectly reference the captioned application as 09/966,777 instead of 09/996,777.

Accordingly, Applicants respectfully request the Examiner to correct the reference numbers, enter the amendments, carefully reconsider the rejections and allow all claims pending in this application.

1. Rejection of Claims 1-3 and 15-26 under 35 U.S.C. § 112, 2nd paragraph

The Office Action rejects claims 1-3 and 15-26 under 35 U.S.C. § 112, 2nd paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Office Action states:

> The ranges for X, Y and d set forth in the claims are not accurate representations of what Applicant finds for successfully practicing the invention.
>
> $$5 < X < 40$$
>
> $$100 < d < 300$$
>
> then
>
> $$145 < 0.29dX < 3480,$$
>
> since
>
> $$Y = 0.29dx$$
>
> therefore
>
> $$145 < Y < 3480$$
>
> whereas
>
> $100 < Y < 300$ set forth in the claims.
>
> Can Y be anything between 100 and 145?

Applicants traverse the rejection because the Examiner is not properly applying basic mathematic principles in making the rejection.

Presumably, the Examiner multiplied the inequality

relationship "5 < X < 40" with the inequality relationship "100 < d < 300" and then multiplied the product with "0.29" to arrive at the relationship "145 < 0.29dX < 3480". However, no known algebraic manipulation allows for the multiplication of inequalities as was done by the Examiner.

Basically, the Examiner is multiplying the putative equation "a = b = c" with "d = e = f" to arrive at "ad = be = cf". No such operation exists. If the Examiner's mathematical operation were correct, a variable "a" having a range from 1 to 10 multiplied by a variable "b" having a range from 1 to 10 would yield "ab" having a range of 1 to 100. This is totally incorrect.

Recognizing the equation (1) of Claim 1 as Y = 0.29dX is fundamentally a mistake, therefore, the Examiner's basis for the Examiner's assertion that "145 < Y < 3480" is similarly incorrect.

Accordingly, Applicants submit that the presently pending claims particularly point out and distinctly claim the subject matter of the invention and request withdrawal of the rejection under § 112, 2nd paragraph.

2. **Rejection of Claims 1-3 and 17-26 under 35 U.S.C. § 103(a)**

The Office Action rejects claims 1-3 and 17-26 under 35 U.S.C.

§ 103(a) as being unpatentable over U.S. Patent 5,492,741 ("Akao et al."). The Office Action states:

> Akao teaches a packaging material comprising a polyolefin foam layer 1 having a density of less than 0.5 g/cm^3, a plurality of polyolefin
>
> layers 3a, 7a, 7a', 3a' laminated on at least one side of the polyolefin foam (abstract, figure 3). The outermost and innermost polyolefin layers 3a, 3a' have the same thickness of 25 microns and a melt flow rate of 5.0 g/10min, (column 47, lines 46 and 55). The foam density, the thickness of the outermost layer and the melt flow rate disclosed by Akao meet the specific ranges required by the claims. Akao fails to meet the thickness range of the innermost layer. However, since the thickness of the innermost layer is not critical to providing unexpected technical advantages, such a variable would have been recognized by one skilled in the art as dependent upon the intended use of the product. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the innermost layer 3a having a thickness instantly claimed motivated by the desire to improve the adhesion and strength of the laminate since it has been held that . . .

Applicants respectfully traverse the rejections because Akao et al. does not teach the presently claimed limitations of a density of a foam layer, a melt flow rate and a thickness of an innermost resin layer satisfying the equation "$Y \leq 0.29\ d\ X$" within the claimed ranges. Even assuming *arguendo* that a *prima facie* exists, Applicants discovered a hitherto unknown "destroying

phenomenon" during co-extrusion and further discovered the presently claimed solution to overcome the problem. In combination, the clear lack of the *prima facie* case along with overwhelming evidence of unexpected results gives rise to a patentable invention.

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

However, even if a *prima facie* case of obviousness has been established, secondary considerations such as commercial success, long felt but unsolved need, failure of others, and unexpected results may nevertheless give rise to a patentable invention. Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). For example, evidence such as superiority in a property the compound shares with the prior art can rebut a *prima facie* case of obviousness. See In re Chupp, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987).

In the present application, independent claim 1 recites a multiple layer laminated polyolefin foam having a plurality of

polyolefin layers laminated on at least one side of a polyolefin foam by a co-extrusion method having

a thickness of an outermost layer from 5 to 80 μm,

a density d of said polyolefin foam from 100 to 300 g/L,

a melt flow rate X of the polyolefin resin constituting the innermost layer among said plurality of polyolefin layers from 5 to 40 g/10 min, and

a thickness Y of the innermost layer of said plurality of polyolefin layers from 70 to 300 μm, and

satisfying relationship (1)

$$Y \leq 0.29\ d\ X \qquad (1).$$

On the other hand, Akao et al. fails to teach any of the presently claimed limitations directed to the density of the foamed layer or the melt flow rate or thickness of the innermost resin layer. Moreover, Akao et al. teaches a totally unrelated cross-linking process to produce the foamed layer and fails to even suggest the problem of a destroying phenomenon of cells during co-extrusion.

Instead, Akao et al. teaches a packaging material and bag for photographic film. The packaging material of Akao et al. comprises a **cushioning** sheet having a density of less than 0.5 g/cm^3, a wear-resistant heat-resistant flexible sheet having a Young's modulus of not less than 50 kg/mm^2 provided on one side of the cushioning

sheet, and a wear-resistant flexible sheet having a Young's modulus of not less than 50 kg/mm^2 provided on the other side of the cushioning sheet, wherein an outermost layer has heat sealability.

Although the Examiner states that Akao et al. teaches a polyolefin foam layer having a density of less than 0.5 g/cm^3, Applicants note that it is the **cushioning** sheet and not the **foamed** layer that has a density of less than 0.5 g/cm^3. See Office Action at page 3, line 3. The **foamed** layer as taught by Akao et al. has a density of not more than 0.1 g/cm^3 (100 g/L), preferably not more than 0.05 g/cm^3 (50 g/L), and even more preferably not more than 0.04 g/cm^3 (40 g/L). See Akao et al. at col. 3, lines 36-39. Akao et al. also teaches that the expansion ratio is 10 to 50 times, and assuming that the resin density is 0.9 g/cm^3 (900 g/L), the density of the polyolefin foam will be in a range of 18 g/L to 90 g/L. See id. at claim 1.

However, the presently claimed lower limit of the density is 100 g/L. Basically, Akao et al. teaches the exact opposite of the presently claimed invention by stating that it would have been preferable for a lower density foam. Moreover, Akao et al. fails to suggest or motivate one of ordinary skill to make the presently claimed invention because this density is clearly outside the presently claimed range of 100 to 300 g/L.

This is not surprising given that Akao et al. relates to a cross-linked polyolefin sheet rather than the presently claimed co-extruded foam. See Akao et al. at col. 3, line 61 to col. 4, line 2, and col. 41, lines 5-9 and lines 11-14. In particular, Akao et al. relates to a cross-linked polyolefin foam sheet that is made by a normal-pressure hot-foaming method rather the presently claimed co-extrusion foaming process.

The difference is critical because in a hot-foaming method, a molten resin containing a cross-linking agent and a decomposable foaming agent is extruded at a temperature that is below the reaction temperature of the cross-linking agent and which is also below the decomposition temperature of the foaming agent. This allows for the formation of an unfoamed sheet.

The unfoamed sheet is then heated to a temperature of at least the reaction temperature of the cross-linking agent thereby forming a cross-linked unfoamed sheet. The unfoamed sheet is then further heated to a temperature of at least the decomposition temperature of the foaming agent, thereby resulting in foaming. On the other hand, in the presently claimed co-extrusion foaming process the foamed layer is foamed under pressure and is not foamed by manipulating temperatures.

Akao et al. also fails to provide any teachings regarding a destroying phenomenon of cells during co-extrusion foaming. One of

ordinary skill at the time of invention would think that in order to increase the strength of a laminated foam, the thickness of the resin layer laminated onto the foam should be increased as pointed out by the Examiner. However, Applicants discovered that cells on a surface part of the foam are destroyed if the thickness of the resin layer laminated onto the foam is increased during co-extrusion. The resulting cell destruction increases the open cell content and reduces a closed cell ratio thereby reducing the density and strength of the laminated product. Applicants note that this destroying phenomenon of cells was discovered by the Applicants.

Turning to the limitations themselves, Applicants note that Fig. 1 shows where the target density d of the polyolefin foam is the minimum value of 100 g/L in accordance with equation 4. The slope of the equation (1) becomes 0.29(100) and expressed as $Y \leq 0.29 \cdot 100 \cdot X$. Thus, according to ranges for the melt flow rate X of the polyolefin resin of the innermost layer and the thickness Y of the innermost layer, the values of the melt flow rate and thickness must fall within the hatched area. Fig.'s 2 and 3 show instances where the density is 150 and 207, respectively.

In summary, the normal-pressure foaming technique of Akao U.S. et al. is unrelated to the present invention and furthermore fails to teach each and every claimed limitation of the present

invention. Clearly, equations (1) to (4) of claim 1 define unobvious and novel limitations over the prior art.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over the cited reference and respectfully request reconsideration and withdrawal of the rejections of claims 1-3 under 35 U.S.C. § 103.

3. Rejection of Claims 15-26 under 35 U.S.C. § 103(a)

The Office Action rejects claims 15-26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,492,741 ("Akao et al.") as applied to claim 1 above, further in view of U.S. Patent 6,316,587 ("Sheen et al."). The Office Action states:

> With regard to claims 17-20, Sheen discloses a synthesis of polyetheramide and polyetheresteramide (column 3, line 21 et seq., column 4, lines 54 et seq).
>
> It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the synthesis of polyetheramide and polyetheresteramide as taught in Sheen to prepare the antistatic agent because it is a typical and practical method of synthesis of the polyamide composition. With regard to claims 21 and 22, the amount of the antistatic agent disclosed by Akao overlaps with the values claimed by the present invention. With regard to claim 23, since Akao as modified by Sheen is using the same antistatic agent (polyether amide and

> polyether esteramide disclosed by Sheen) and the same base resin of the outermost layer having a melt flow rate of 5.0 g/10 min (Akao, column 47, line 46), it is the examiner's position that the ratio of the melt flow rate would be inherently present. Products of identical chemical composition cannot have mutually exclusive properties. In re Spade, 15 USPQ 2d 1655 (1990).
>
> With regard to claims 24-26, Akao teaches the laminated foam sheet of closed-cell type having a thickness ranging from 100 microns to 5mm (example 1, column 3, lines 40-45). However, such a variable would have been recognized by one skilled in the art. As such, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ laminated foam having a thickness instantly claimed motivated by the desire to improve the physical strength and cushioning ability of the packaging material since it has been held . . .

Applicants respectfully traverse the rejection because the primary reference Akao et al. does not teach the presently claimed invention as stated *supra*. In particular, Akao et al. fails to teach or suggest to one of ordinary skill to make the claimed limitations directed towards a density of a foam layer, a melt flow rate and a thickness of an innermost resin layer satisfying the equation "$Y \leq 0.29$ d X". Even assuming *arguendo* that a *prima facie* exists, Applicants discovered a hitherto unknown "destroying phenomenon" during co-extrusion and furthermore discovered the presently claimed solution to overcome the problem. In

combination, the clear lack of the *prima facie* case along with overwhelming evidence of unexpected results gives rise to a patentable invention over the cited references.

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

However, even if a *prima facie* case of obviousness has been established, secondary considerations such as commercial success, long felt but unsolved need, failure of others, and unexpected results may nevertheless give rise to a patentable invention. Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). For example, evidence such as superiority in a property the compound shares with the prior art can rebut a *prima facie* case of obviousness. See In re Chupp, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987).

In the present application, independent claim 1 and therefore all the dependent claims claim a multiple layer laminated polyolefin foam having a plurality of polyolefin layers laminated on at least one side of a polyolefin foam by a co-extrusion foaming

method having

a thickness of an outermost layer from 5 to 80 μm,

a density d of said polyolefin foam from 100 to 300 g/L,

a melt flow rate X of the polyolefin resin constituting the innermost layer among said plurality of polyolefin layers from 5 to 40 g/10 min, and

a thickness Y of the innermost layer of said plurality of polyolefin layers from 70 to 300 μm, and

satisfying relationship (1)

$$Y \leq 0.29\, d\, X \qquad (1).$$

On the other hand, Akao et al. fails to teach any of the presently claimed limitations directed to the density of the foamed layer or the melt flow rate or thickness of the innermost resin layer. Moreover, Akao et al. teaches a totally unrelated cross-linking process to produce the foamed layer and fails to even suggest the problem of a destroying phenomenon of cells during co-extrusion.

Instead, Akao et al. teaches a packaging material and bag for photographic film. The packaging material of Akao et al. comprises a **cushioning** sheet having a density of less than 0.5 g/cm^3, a wear-resistant heat-resistant flexible sheet having a Young's modulus of not less than 50 kg/mm^2 provided on one side of the cushioning sheet, and a wear-resistant flexible sheet having a Young's modulus

of not less than 50 kg/mm^2 provided on the other side of the cushioning sheet, wherein an outermost layer has heat sealability.

Although the Examiner states that Akao et al. teaches a polyolefin foam layer having a density of less than 0.5 g/cm^3, Applicants note that it is the **cushioning** sheet and not the **foamed** layer that has a density of less than 0.5 g/cm^3. See Office Action at page 3, line 3. The **foamed** layer as taught by Akao et al. has a density of not more than 0.1 g/cm^3 (100 g/L), preferably not more than 0.05 g/cm^3 (50 g/L), and even more preferably not more than 0.04 g/cm^3 (40 g/L). See Akao et al. at col. 3, lines 36-39. Akao et al. also teaches that the expansion ratio is 10 to 50 times, and assuming that the resin density is 0.9 g/cm^3 (900 g/L), the density of the polyolefin foam will be in a range of 18 g/L to 90 g/L. See id. at claim 1.

However, the presently claimed lower limit of the density is 100 g/L. Basically, Akao et al. teaches the exact opposite of the presently claimed invention by stating that it would have been preferable for a lower density foam. Moreover, Akao et al. fails to suggest or motivate one of ordinary skill to make the presently claimed invention because this density is clearly outside the presently claimed range of 100 to 300 g/L.

This is not surprising given that Akao et al. relates to a

cross-linked polyolefin sheet rather than the presently claimed co-extruded foam. See Akao et al. at col. 3, line 61 to col. 4, line 2, and col. 41, lines 5-9 and lines 11-14. In particular, Akao et al. relates to a cross-linked polyolefin foam sheet that is made by a normal-pressure hot-foaming method rather the presently claimed co-extrusion foaming process.

The difference is critical because in a hot-foaming method, a molten resin containing a cross-linking agent and a decomposable foaming agent is extruded at a temperature that is below the reaction temperature of the cross-linking agent and which is also below the decomposition temperature of the foaming agent. This allows for the formation of an unfoamed sheet.

The unfoamed sheet is then heated to a temperature of at least the reaction temperature of the cross-linking agent thereby forming a cross-linked unfoamed sheet. The unfoamed sheet is then further heated to a temperature of at least the decomposition temperature of the foaming agent, thereby resulting in foaming. On the other hand, in the presently claimed co-extrusion foaming process the foamed layer is foamed under pressure and is not foamed by manipulating temperatures.

Akao et al. also fails to provide any teachings regarding a destroying phenomenon of cells during co-extrusion foaming. One of ordinary skill at the time of invention would think that in order

to increase the strength of a laminated foam, the thickness of the resin layer laminated onto the foam should be increased as pointed out by the Examiner. However, Applicants discovered that cells on a surface part of the foam are destroyed if the thickness of the resin layer laminated onto the foam is increased during co-extrusion. The resulting cell destruction increases the open cell content and reduces a closed cell ratio thereby reducing the density and strength of the laminated product. Applicants note that this destroying phenomenon was discovered by the Applicants.

Turing to the limitations themselves, Applicants note that Fig. 1 shows where the target density d of the polyolefin foam is the minimum value of 100 g/L in accordance with equation 4. The slope of the equation (1) becomes 0.29(100) and expressed as $Y \leq 0.29 \cdot 100 \cdot X$. Thus, according to ranges for the melt flow rate X of the polyolefin resin of the innermost layer and the thickness Y of the innermost layer, the values of the melt flow rate and thickness must fall within the hatched area. Fig.'s 2 and 3 show instances where the density is 150 and 207, respectively.

Regarding the rejection over claims 17-20, Applicants note that presently pending claims 17-20 do not relate to a method of synthesizing an antistatic agent itself but rather an antistatic agent suitable for giving a specific antistatic performance. There simply is no connection between the description in Sheen et al. and

the present invention.

Regarding the rejection over claims 21 and 22, Applicants note that even if the amount of antistatic agent blended into the present invention coincides with that in Akao et al., Akao et al. nevertheless fails to teach the base limitations of independent claim 1.

Regarding the rejection over claim 23, Applicants note that Akao et al. merely describes a polymer constituting the wear-resistant flexible sheet and fails to teach the particularly claimed limitations of claim 1.

Regarding the rejection over claims 24-26, Applicants note that the description pointed out by the Examiner describes the thickness of the foam sheet in Akao et al. However, claims 24-26, claim the thickness of the whole of the laminated foam of the present invention not just of the foam sheet.

In summary, the normal-pressure foaming technique of Akao U.S. et al. is unrelated to the present invention and furthermore fails to teach each and every claimed limitation of the present invention. Clearly, equations (1) to (4) of claim 1 define unobvious and novel limitations over the prior art.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over the cited reference and respectfully request reconsideration and withdrawal of the

rejections of claims 15-26 under 35 U.S.C. § 103.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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